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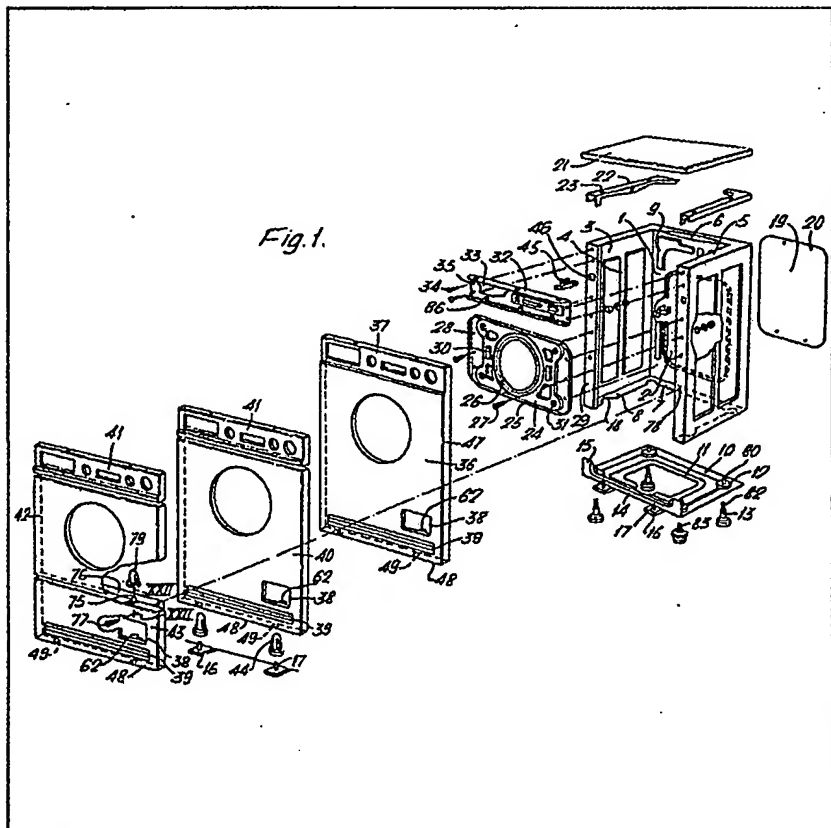
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(54) Improvements in and relating to washing machines

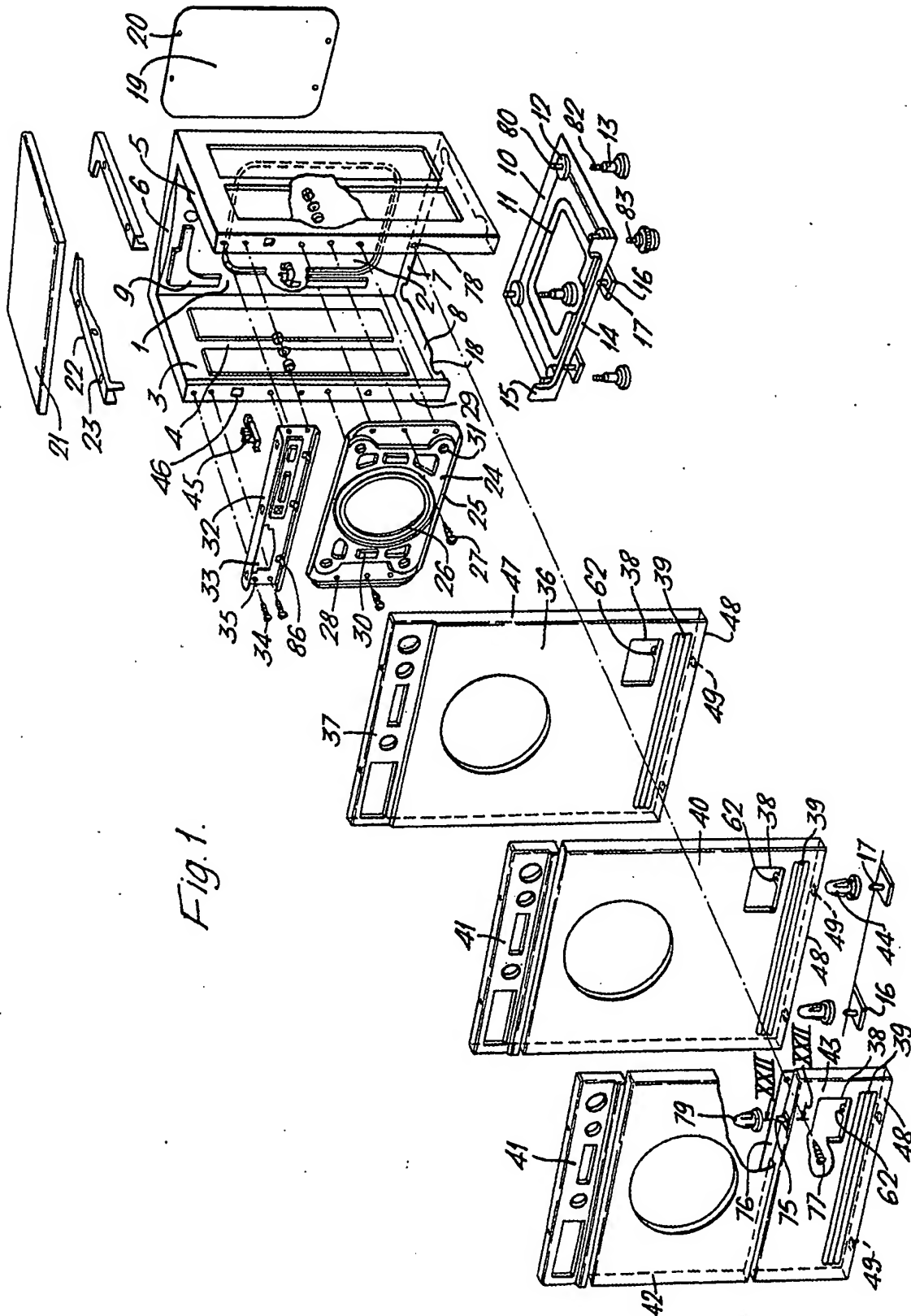
(57) A supporting frame for the functional components of a washing machine is devised in such a way that access to said components from the front of the machine is facilitated.

The frame comprises a supporting member (1) in the form of an incomplete orthogonal box which is open at the front, top and base. A rear aperture (2) is closable by a cover panel (19), and top and base are respectively closed by

corresponding panels (21), (10). Across the front opening of the supporting member (1) are detachably located a rigid metal plate (24) with which the greater part of the functional components of the machine are coordinated and an upper transverse panel (32) to which the controls of the machine are attached. A front panel (36, 40 or 42) which may be in one or more portions covers the metal plate (24) and transverse panel (32) and is easily removable for access to the front of the machine.



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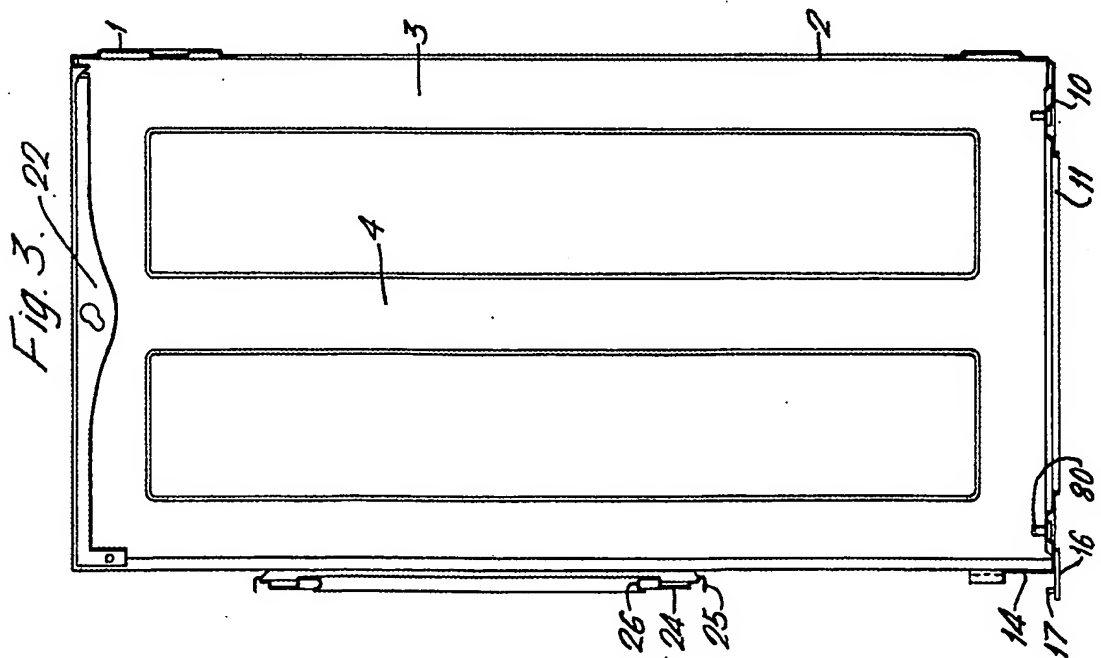
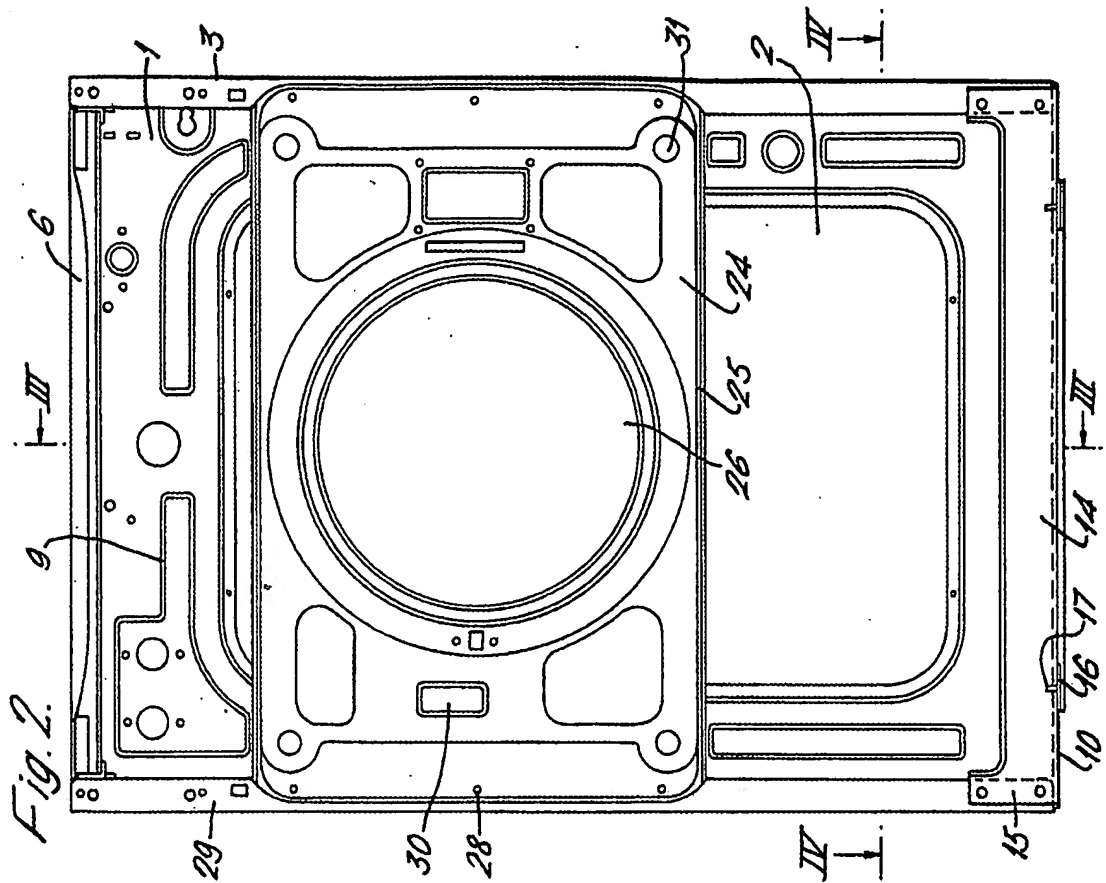


Fig. 4.

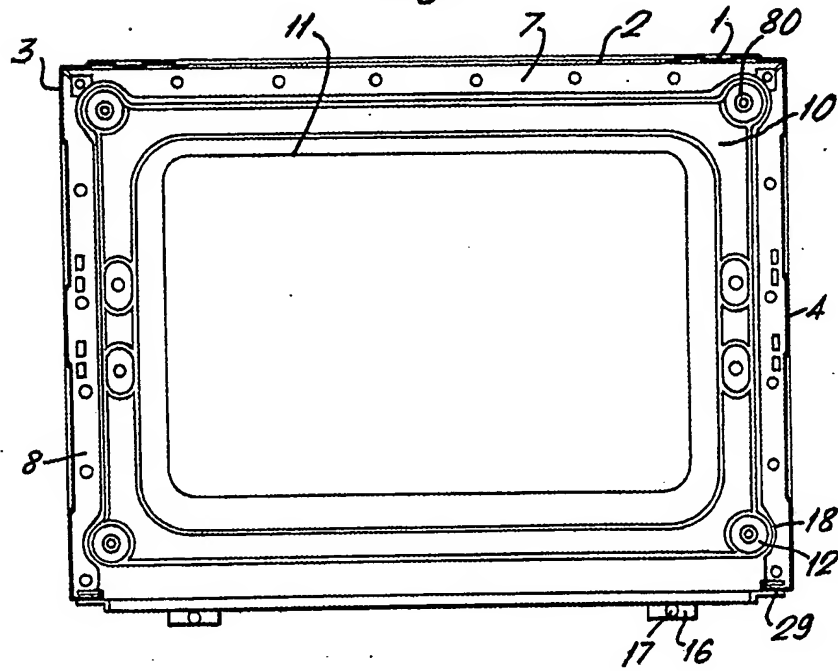
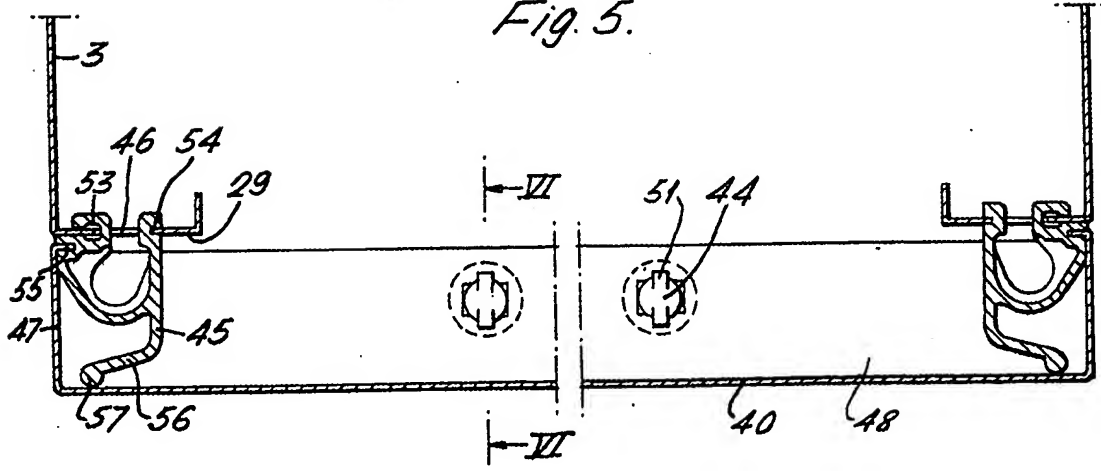


Fig. 5.



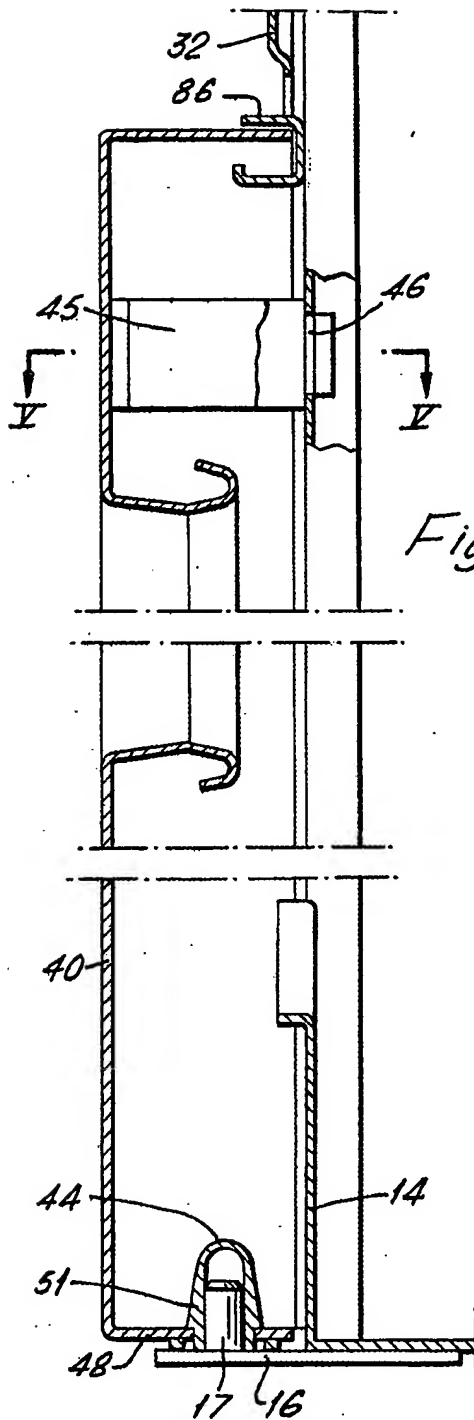


Fig. 6.

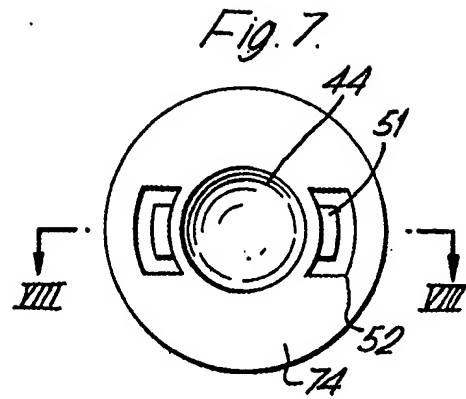


Fig. 7.

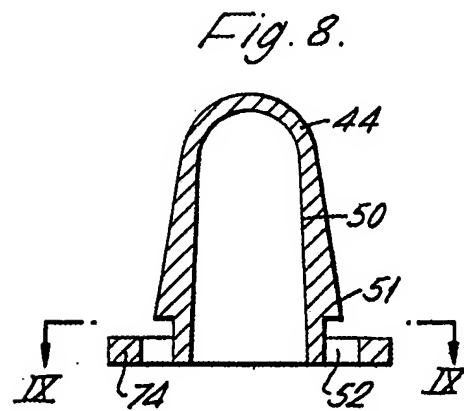


Fig. 8.

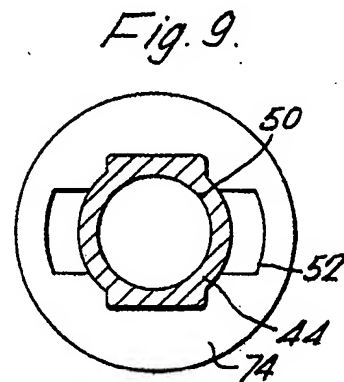


Fig. 9.

Fig. 10.

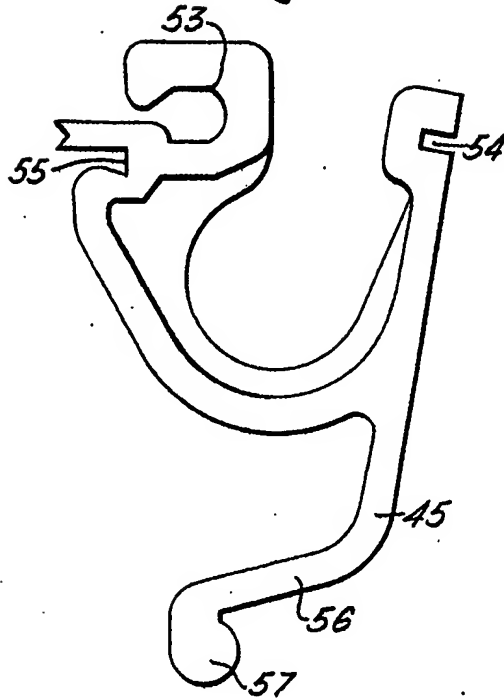


Fig. 11.

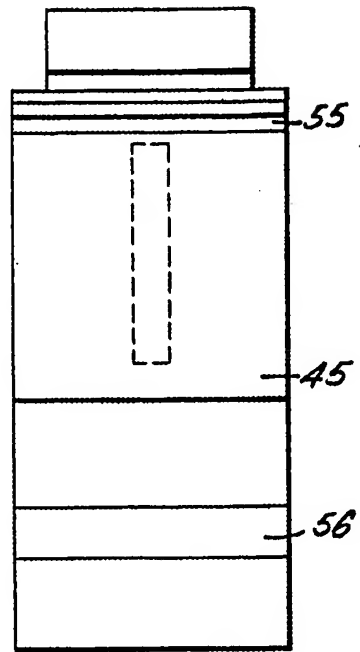
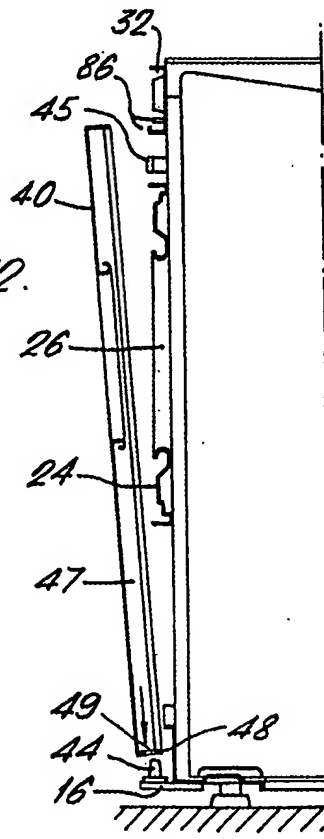
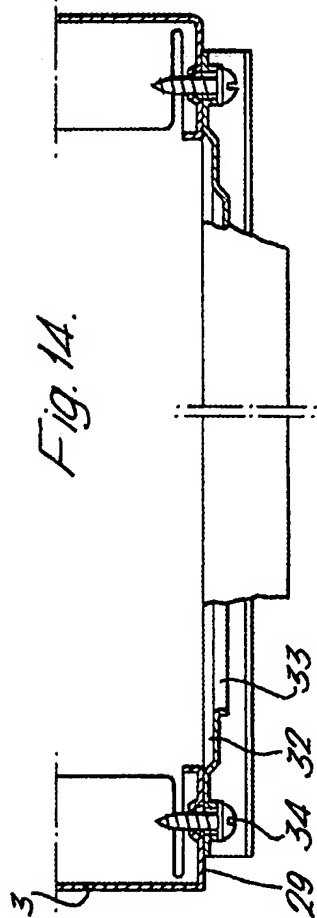
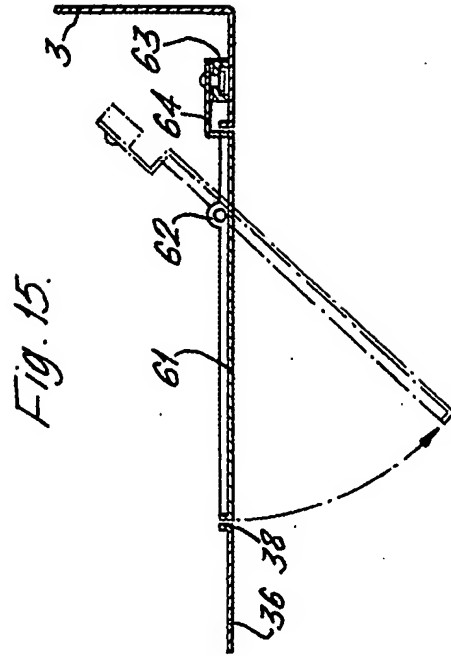
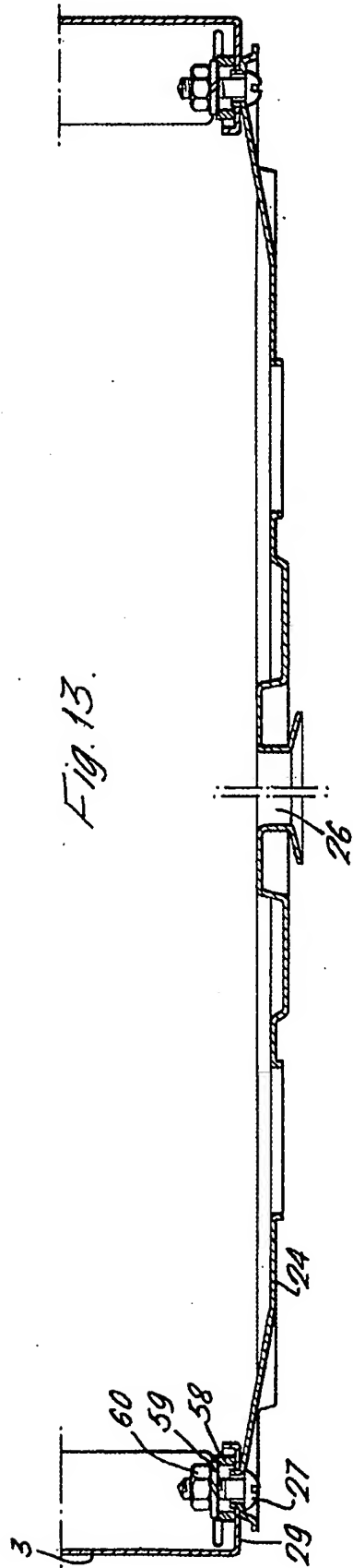


Fig. 12.





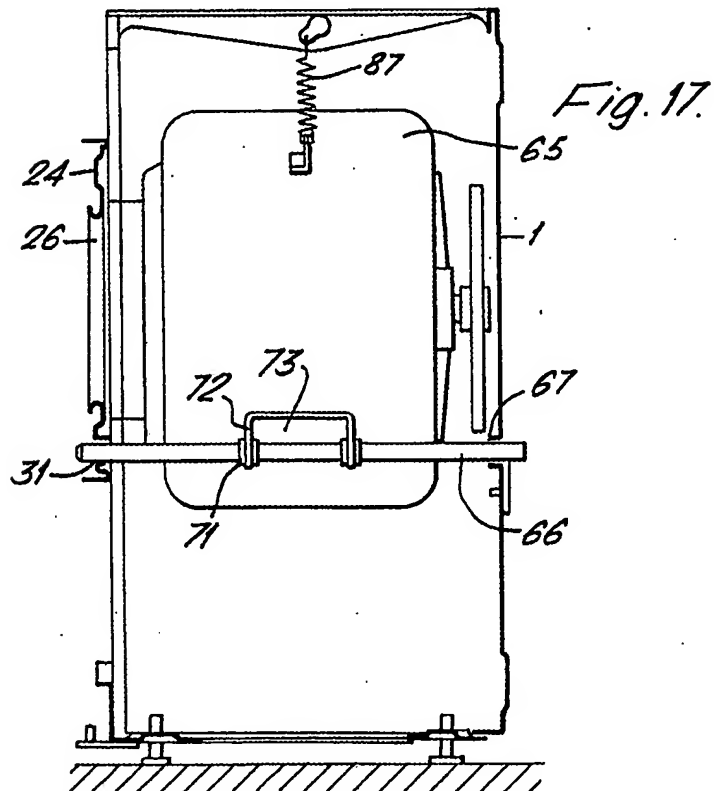
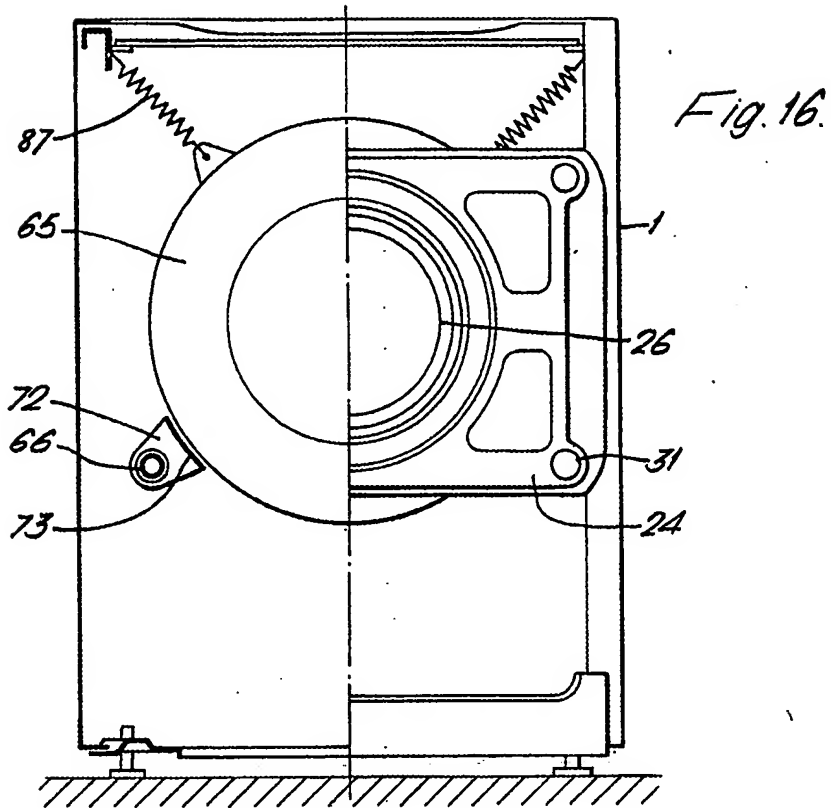


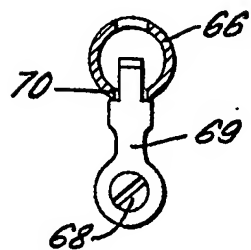
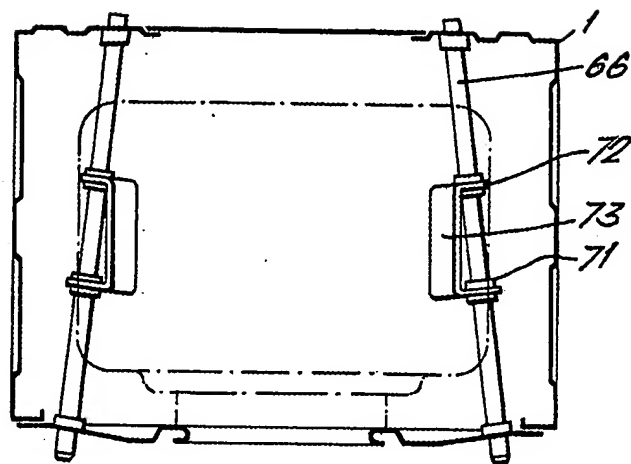
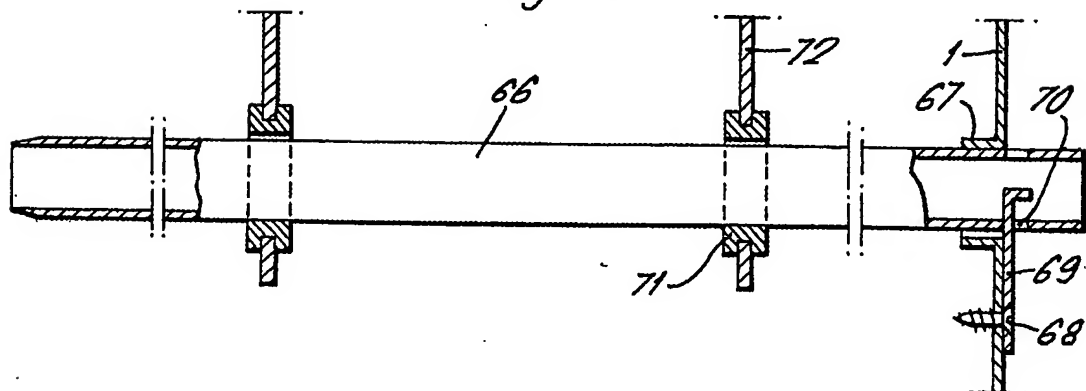
Fig. 19.*Fig. 20.**Fig. 18.*

Fig. 21.

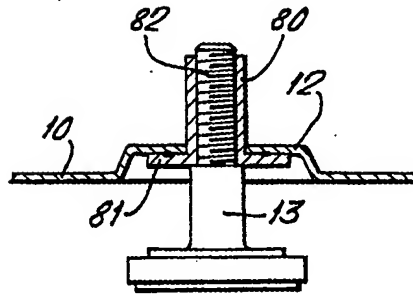


Fig. 22.

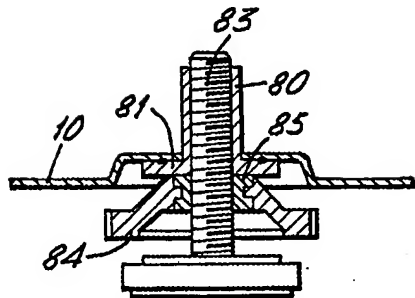
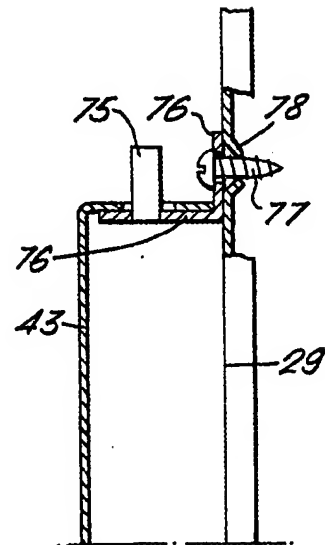


Fig. 23.



SPECIFICATION

Improvements in and relating to washing machines

5 This invention concerns improvements in washing machines, and more especially to the framework for supporting the functional components of a washing machine such as the tub, the rotary pump, the motor and driving mechanisms coordinated with the latter, 10 controlling and checking elements, devices for the addition of detergents and other devices normally forming component parts of such a machine. The invention also concerns improvements to the sheathing formed by the outer protective and ornamental 15 casing of the machine, of which the front side comprises the opening for the insertion and withdrawal of the articles of clothing which are to be washed.

According to one aspect of the invention there is 20 provided a supporting frame for the functional components of a washing machine, incorporating a supporting member in the form of an incomplete orthohedral box made up of three integral sides respectively forming the rear and lateral vertical 25 sides and open at the vertical front side and the top and base, the said supporting member being a rigid sheet metal structure, incorporating in its rear side a main opening equipped with a sealing panel secured at its edges, and the said sides comprising perfora- 30 tions and reinforcements as well as, at their free edges, longitudinal flanges of which the planes extend at right angles to the said sides.

According to preferred features of the invention which are to be described by way of example below 35 the structure of the framework and of the casing is devised in such manner that all the functional parts of importance of the machine may be reached from the front side of the latter, for which purpose the same has been designed in such manner that it is 40 possible to detach the casing and uncover the components of which the greater proportion are coordinated with a panel in the form of a gate or the like, which is secured behind the front panel of the machine. The controls of the machine are equally 45 secured to a removable transverse member, allowing the same to be inspected or replaced very easily.

Another aspect of the invention consists in a system for the temporary locking of the tub of the machine for transport of the latter, which system is 50 disabled when the machine has reached its place of installation, the separation of some parts used temporarily for the said locking action then being very simple.

The invention is illustrated by way of example in 55 the accompanying drawings, in which:

Figure 1 is an exploded view of the components of the framework, as well as of the front section, relating to three embodiments of a washing machine in accordance with the invention,

60 *Figure 2* is a front elevation of the framework with its carrying panel incorporated,

Figure 3 is a sectional elevation on the line III - III of *Figure 2*,

Figure 4 is a sectional plan view on the line IV - IV 65 of *Figure 2*,

Figures 5 and 6 are enlarged fragmentary cross-sectional views taken on lines V - V and VI - VI of *Figures 6 and 5* respectively showing the manner in which the front side of the machine is secured 70 thereto,

Figure 7 is a plan view of a securing and hinge element,

Figures 8 and 9 are sectional views of lines VIII - VIII of *Figure 7* and IX - IX of *Figure 8* respectively,

75 *Figures 10 and 11* illustrate a resilient securing element,

Figure 12 demonstrates the manner in which the latter is secured to the body of the casing,

80 *Figures 13 and 14* demonstrate the manner in which the supporting panel and the control board are secured to the framework of the washing machine,

Figure 15 depicts a detail showing the structure of the door giving access to a bottom filter,

85 *Figures 16, 17, 18, 19 and 20* illustrate the system for temporary locking of the tub of the machine for cartage of the latter,

Figures 21 and 22 show the floor-mounting feet, and

90 *Figure 23* shows a detail of the fastening of the front side of the machine.

Referring more especially to *Figure 1* of the drawings, a washing machine in accordance with one embodiment of the invention comprises a 95 central framework 1, formed by a member of incomplete orthohedral box shape lacking the base, top and the front side.

The framework 1 has a central opening 2 in the rear side thereof which is closed at the appropriate 100 time during manufacture by means of a plate 19 secured by screws inserted through holes 20 in its periphery. The lateral sides 3 of the framework incorporate pairs of vertical dished portions separated by central uprights 4, and upper flanges 5 at the sides of the framework define an inner notch 6 in the central part. Similar flanges 7 and 8 at the bottom 105 sections of the framework extend parallel to the upper flanges 5. Numeral 9 indicates dished portions and openings in the central part 1 of the framework.

110 A rigid metal panel 10 forms the lower base of the framework and comprises a central opening 11. The panel 10 incorporates at its corners raised portions 12 having means for receiving the shanks of adjustable floor-mounting feet 13 as described below, and at the front of the panel 10 is an upright flange 14 having upwardly extending end portions 15. The panel 10 further has forward extensions 16 equipped with vertical pins 17. The bottom flanges 7 and 8 have recesses 18 in alignment with the members 12 120 of the base panel 10, for receiving said members 12.

The casing of the machine comprises a top cover 21 in the form of a panel with flanges at its sides, intended to be fitted on elements 22 having an L-shaped cross-section, which are positioned at the 125 top of the lateral sides 3 of the framework 1 and can be secured thereon by means of screws inserted into holes 23.

A rigid panel 24 formed by stamping from rectangular metal plate, has a peripheral flange 25 and a 130 central opening 26 in alignment with an aperture for

access to the inside of the tub of the washing machine. The panel 24 is secured to the front of the framework 1 by means of fastening screws 27 passed through peripheral holes 28 of the panel 24 and holes in front flanges 29 of the lateral sides 3. The panel 24 is fastened in place against the lateral flanges 29 of the frame, by means of an annular element 58, a washer 59 and a lock nut 60 engaging the screw 27 at the inner side of flange 29 as illustrated in Figure 13. The panel 24 also comprises stamped-out reinforcing portions 30 and openings 31 intended to allow the insertion of screws for locking the tub in a manner to be described below.

A bracing member 32 comprising a metal plate having longitudinal flanges, stamped-out portions and openings 33 for the insertion of the machine controls is secured to the flanges 29 of the frame with screws 34 inserted through holes 35 at the extremities of the member 32. A unitary front panel 36 of the machine comprises an upper portion 37 intended for the controls, a lower portion having a port 38 for access to a filter, and stamped-out portions 39 of decorative and ornamental nature.

Also shown in Figure 1 are alternative front panels 40 and 42 for use in the construction of alternative embodiments of the machine. The panel 40 has a separate upper portion 41 intended for the controls, whereas the panel 42 has a separate portion 41 intended for the controls and also a separate bottom portion 43 comprising the port 38 and stamped-out portion 39 as in the case of the other embodiments.

In each case the panel 36, 40 or 42 is secured at the lower edge by elements 44 of resilient material such as rubber or plastics material, of bell shape, which are positioned over the pins 17 at the lower front part of the framework and engage in a flange 48 of the panel, the latter flange having openings 49 into which are inserted the said elements 44 as illustrated more clearly in Figure 12. As shown in more detail in Figures 7 - 9 each element 44 comprises a base 74, a barrel portion 50, lateral projections 51 and lateral openings 52. Lateral flanges 47 of the front panel are secured by members 45 of resilient material and of "h" shape as illustrated in particular in Figures 10 and 11. As shown in more detail in Figure 5, hooked portions 53 and 54 of the member 45 are engaged in each case in one of the openings 46 formed in the flanges 29 of the frame 1 and the lateral flanges 47 are engaged in notches 55, whereas the extension 56 having an extremity 57 engages the inner surface of the front panel 36 causing resilient retention of the same.

As shown in Figure 13 the lower opening 38 of the front panel has a small door 61 for access to a water filter, the door 61 being pivotable around a vertical spindle 62. The inner side of the small door flap has an extension comprising a permanent magnet 63 secured in a pressed-out portion 64 and cooperating with the inner surface of the front side of the machine.

In the case of the panel 42 having the lower portion 43 which provides the opening 38 for access to the water filter, the lower portion 43 has upwardly extending projections 75 from its upper flange 76 which enable the fastening of the upper portion of

panel 42 which forms the circular opening in alignment with the port for access to the inside of the tub. As shown in Figure 23 the flange 76 is secured to the frame 1 by screws 77 inserted into openings made in the flange 76 and into openings 78 in the front flanges 29. Resilient elements 79 similar to the elements 44 are affixed on the projections 75 and are inserted into openings formed in the lower flange of the panel 42. The panels 40 and 42 are located at their upper edge by lugs 86 excised from the lower portion of the control panel 32 for retention of the upper flange of the panel when the latter is installed on the elements 44 (or 79), as apparent from Figures 6 and 12.

Referring to Figures 16 - 20, there are shown a tub 65, suspended from above by coil springs 87, and within which revolves the drum containing the laundry which is to be washed, together with means for location of the tub 65 in a fixed position during transport. Tubular bars 66 are positioned horizontally and obliquely at either side of the tub 65 for temporary locking of the same in position, for which purpose they are inserted through two openings 31 at the bottom of the panel 24 and through corresponding aligned openings present in the central rear wall of the frame 1 as shown in Figures 17 and 18, 67 being a cylindrical collar in each of these last openings for guiding the tubular bars 66 which are retained by an uncomplicated system comprising a small plate 69 fastened to the frame 1 by means of a screw 68 and engaged in an opening 70 formed in each tubular bar 66. Resilient annular bushes 71 are provided in aligned apertures 72 formed in members 73 welded on to the sides of the tub 65, and are engaged by the bars 66 with a slight clearance.

As shown in Figures 21 and 22, sleeves 80 are secured by their bases 81 in the existing circular portions 12 adjacent to the corners of the bottom panel 10. In Figure 21 the sleeve 80 is screw-threaded to receive the shank 82 of a foot 13 whereby the height may be altered. Alternatively as shown in Figure 22 a shank 83 of an adjustable foot is located in the corresponding sleeve 80 and a nut 85 integral with an annulus 84 is arranged to allow the same to be adjusted to place the shank 83 in the position required for levelling the machine.

The system described above provides a substantial simplification of the supporting structure of a washing machine, combined with an optimum strength and rigidity, and also provides easy access to the inside of the machine from the front side of the same, the front side and the elements applied temporarily for locking the tub during transport being removable with maximum ease.

CLAIMS

1. A supporting frame for the functional components of a washing machine, incorporating a supporting member in the form of an incomplete orthohedral box made up of three integral sides respectively forming the rear and lateral vertical sides and open at the vertical front side and the top and base, the said supporting member being a rigid sheet metal structure, incorporating in its rear side a

main opening equipped with a sealing panel secured at its edges, and the said sides comprising perforations and reinforcements as well as, at their free edges, longitudinal flanges of which the planes

5 extend at right angles to the said sides.

2. A frame as claimed in Claim 1, wherein the upper flanges of the lateral sides of the supporting member act as supports for elongated members of L-shaped cross-section upon which is supported a

10 panel forming the top of the casing of the washing machine, whereas the lower flanges have attached to them a rigid rectangular panel which in areas close to its corners comprises openings incorporating sleeves for engagement of the shanks of adjustable floor-mounting feet and at its front has a flange

15 comprising two frontal horizontal projections equipped with vertical studs intended for securing the lower portion of a front panel of the casing.

3. A frame as claimed in Claim 1 or 2, wherein

20 the upper central portion of the open front side of the said supporting member is closed by a rigid metal plate secured by means of screws inserted through openings in its edges and in the front flanges of the supporting member, said rigid metal plate comprising reinforcements and openings in its surface and in particular a central opening in alignment with the

25 aperture for access to the inside of the tub of the washing machine.

4. A frame as claimed in any one of Claims 1 - 3,

30 wherein the upper front portion of the supporting member is closed by a transverse panel equipped with longitudinal flanges along its longer sides and secured at its extremities by means of screws to the front flanges of the said supporting member, said

35 transverse panel being provided with perforations and openings intended to secure controlling and checking elements of the washing machine.

5. A frame as claimed in Claim 2, or Claim 3 or 4 as appended thereto, wherein a front panel of the

40 casing of the machine is secured with respect to the said supporting member of the machine by means of hollow resilient elements engaged over the said vertical studs and over which, in turn, is applied a flange extending from the lower edge of the said

45 front panel and having openings in alignment with the said resilient elements upon which the flange is seated.

6. A frame as claimed in Claim 5 as appended to Claim 4, wherein said front panel comprises upper

50 and lower portions of which the lower edge of the lower portion comprises said flange secured over said resilient elements and the upper edge of said lower portion comprises vertical lugs for receiving further hollow resilient elements for engagement

55 with the lower edge of said upper portion via a lower flange thereof having openings in alignment therewith, the upper edge of the said upper portion being retained by lugs formed in the said transverse panel for securing the said control elements.

7. A frame as claimed in Claim 5 or 6, in which

60 said hollow resilient elements comprise bell-shaped members having constrictions for snap-engagement with said openings.

8. A frame as claimed in any one of Claims 5 - 7,

65 in which the upper portion of the said front panel of

the casing is effected by means of approximately "h"-shaped resilient elements each of which has at the extremities of its shorter branches, opposed hooked portions for catching the edges of openings

70 made in the said front flanges of the supporting member, and further has a notch intended for receiving an internal flange formed laterally upon the front panel which is to be secured, whereas the extremity of the free branch of the "h"-shaped

75 element is applied against the inner surface of the resiliently retained front panel.

9. A frame as claimed in Claim 3 or any one of Claims 4 - 8 as appended thereto, in which the said rigid metal plate forming said central opening for

80 access to the inside of the tub is fastened to the front flanges of the said supporting member by means of an assembly of screws, nuts and locking washers, with annular elements interpositioned between the latter and the internal surface of the said flanges, the arrangement being such as to allow the removal of

85 the said plate for the purpose of inspection or replacement of functional components of the machine solely through the front part of the same.

10. A frame as claimed in Claim 5 as appended to

90 Claim 4 or any one of Claims 6 - 9 as appended thereto, in which the said transverse panel carrying the controls of the machine is secured via its extremities by means of self-tapping screws inserted through openings made in alignment in the extremi-

95 ties of the said panel and in the front flanges of the supporting member of the machine, in such manner that the complete removal of the said transverse panel from the assembled machine is possible prior to the removal of the said front panel.

11. A frame as claimed in any one of Claims 1 - 10, in which a small door panel for access to a water filter situated in the lower portion of the body of the washing machine incorporates a closure system

100 comprising an internal extension in the extension of the plane of the small hinged door and a permanent magnet secured to a stamped-out portion formed in the said extension and cooperating with the internal surface of the front side of the casing of the machine.

12. A frame as claimed in any one of Claims 1 - 11 incorporating a washing tub opposite sides of which are equipped with pairs of lugs formed by C-shaped members welded to the said opposite

110 sides of the tub and comprising openings aligned along two horizontal axes which are symmetrically oblique with respect to the central axis of the tub and serve for the purpose of receiving two tubular bars of which the extremities are inserted, respectively, through pairs of openings present in a front framing panel and in a rear sealing cover of the machine

120 casing, the said bars being secured in the same by means of locking devices cooperating with terminal incisions present in the said bars.

13. A supporting frame for the functional components of a washing machine, substantially as described herein with reference to the accompanying

125 drawings.

14. The features herein described, or their equivalents, in any novel selection.